THE VETERINARY RECORD

FOUNDED BY WILLIAM HUNTING, F.R.C.V.S., 1888

No. 23. JUNE 7, 1952 VOL. 64.

POISONING IN DOMESTIC ANIMALS AND BIRDS*
An Analysis of 360 Consecutive Cases

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This paper is based on the records of a series of 360 consecutive cases of poisoning in domestic animals and birds, received for analysis from veterinary surgeons in general practice. They therefore represent, broadly speaking, what is encountered by general practitioners in this country. I have excluded from the series all cases of poisoning in wild birds and animals and also cases of " doping " in greyhounds and racehorses, since these two classes cannot be regarded as cases met with in general practice and in any case would require separate treatment and consideration.

For convenience I am considering the cases under the four groups into which they fall for purposes of chemical analysis. Thus in the Table the volatile poisons, alcohol to zinc phosphide, come first, then the metals, arsenic to lead, followed by the non-volatile organic poisons, solanine to theobromine, and finally the rather indefinite group, represented by salt and sodium fluoride, which comprises any chemicals not included in the first three classes.

	Horse	Ox	Sheep	Pig	Dog	Cat	Fowl	Duck Goose	Total
Alcohol ...		1							1
Carbon monoxide...					1				1
Cyanide ...					1(1)				2
Metaldehyde					1			1	2
Mustard oil							1		1
Nicotine ...		1							1
Phenols ...					1				1
Phosphorus		2	1	1		3	36	11	54
Zinc [phosphide]	1	10		1	6	4	26	5	53
Arsenic ...	2	13	8		1	1	7		32
Barium ...					2		1		3
Copper ...		1						1	2
Lead ...	2	77	1	4	2	1	3	6	96
Solanine ...				1	1		1		3
Strychnine...				1	72	2		1	76
Taxine ...	1	2	1				1		5
Theobromine							1		1
Salt... ...		3		8			11	3	25
Sodium fluoride ...				1					1
Total ...	6	110	11	17	89	11	88	28	

* Paper presented to the Herts and Beds Division, B.V.A., at St. Albans, February 21st, 1952.

THE VOLATILE POISONS

The most striking point about this group is that the cases of phosphorus and zinc phosphide constitute no less than 107 out of the total of 116, and it is on these two poisons that I shall spend most of the time devoted to it. With regard to the others you will note the comparative rarity of poisoning by cyanides (two cases) and phenols (one case), both " classical " poisons. (The cyanide case in brackets occurred in a mink farm.) The alcohol case arose as a result of badly stored foodstuffs having fermented and was not fatal. The source of the carbon monoxide which produced the death of a dog was an escape of coal gas. The metaldehyde cases were due to the ingestion of slug-killer, which contained this chemical: another source of it is the solid fuel " Meta " which is widely on sale throughout this country in the form of small rectangular white tablets. The incautious use of unrationed foodstuffs during the war was responsible for the mustard oil poisoning, the fowls having been given a mustard meal in their mash, and too heavy a dressing of an anti-parasitic lotion caused the only case of nicotine poisoning recorded in the Table.

PHOSPHORUS

This has been used for many years as a vermin killer and such preparations were the source of the poison in most of the cases encountered. An additional source, however, arose during the war, namely, fragments of incompletely combusted phosphorus bombs dropped by enemy aircraft or used by our own troops in training. The fowl was the chief victim of this poison (36 out of 54 cases), but as you see, it was met with in all species except the horse and dog. In most cases the animal or bird was found dead and in some, but by no means all, at *post-mortem* examination the peculiar garlic-like odour of phosphorus could be detected in the crop or stomach contents: in others the natural smell of the ingesta was sufficiently strong to mask this, although the poison was readily detected chemically. The most interesting cases we received were the three which occurred in cats, the details of which were as follows:—

Case No. 17137.—An eight-year-old neutered male cat, a keen mouser, was let out at 9 a.m. after having some milk. It returned at 11 a.m., vomited twice " some thick stuff resembling salmon paste," sat in the sun and cleaned itself, and then walked across the neighbouring allotments. It returned to the house at noon, had a little bovril, lay on a bed and appeared to be asleep. It was found asleep under the eiderdown in the evening. About 12.45 a.m. the following morning the cat jumped from the bed to the floor, wandered about attempting to vomit, and passed urine. It clawed the carpet and opened its mouth as if choking ; it uttered no cries but bit at the air and finally fell on its side gasping and died within about 15 minutes of jumping off the bed. The owner suspected rat poison as she had heard that this had been laid down on the allotments.

The *post-mortem* examination (about 60 hours after death) revealed a well-nourished carcase 10¼ lb. in weight. There was no abnormality in the mouth or pharynx ; the tonsils were slightly swollen and pink ; the superior cervical lymphatic glands were enlarged. The stomach was empty, its wall was contracted and its mucosa was a diffuse pink colour. There was slight congestion of the small intestine which was infected with *T. taeniaformis* and contained a little chyle and mucus. The rectum contained 20 grammes of firm faeces, bound together by hair, in the form of four lumps about the size and shape of hazelnuts and having a strong odour of garlic. The

liver was normal in size, pale and marbled with paler opaque areas, some of which were of greyish yellow colour and of india-rubber consistency. The kidneys showed prominent cortical blood vessels. The thorax contained about 2 oz. of clear yellow fluid ; the lungs were oedematous with frothy fluid in the bronchi. The heart showed a pale myocardium and contained dark and incompletely clotted blood. The meningeal veins were congested ; otherwise no macroscopic lesions were detected in the central nervous system. *Beta-haemolytic streptococci* were isolated from the tonsil and the lung ; cultures from the liver, kidney and heart blood were sterile. Approximately $\frac{1}{4}$ grain of free phosphorus per oz. was separated from the rectal contents. No phosphorus was detected in the stomach, ileum or liver.

Case No. 22638.—A neutered female cat, approximately four years old, which had been in the owner's possession for two years, was let out for a short time one evening and remained indoors for the rest of the night. At 9 a.m. the following morning the veterinary surgeon called in found it lying on its side, its mouth tightly clenched and all four legs fully extended ; it appeared to be almost lifeless. Coramine was injected, but death occurred about 11 a.m.

The *post-mortem* examination (about 48 hours after death) revealed mild emaciation and moderate anaemia. There was no abnormality in the mouth or throat. The stomach and duodenum showed chronic mucoid catarrh and were infected with *Toxascaris* roundworms. The stomach contained a little thick mucus only. The rectum contained 25 grammes of firm, rather dry faeces mixed with hair and coated with mucus ; it had a faint garlic odour. There was acute necrosis of the liver. *Beta-haemolytic streptococci* were isolated from the tonsil ; cultures from the lung, heart, liver and spleen were sterile. Approximately $\frac{1}{4}$ grain of free phosphorus per oz. was separated from the rectal contents. No phosphorus was detected in the stomach.

Case No. 30257.—This was an adult female cat of which no clinical history was available. The *post-mortem* examination (about 30 hours after death) revealed mild emaciation and moderate anaemia. The tonsils were pale and enlarged ; there was patchy congestion of the lungs. The stomach and intestine showed chronic catarrh due to infection with numerous tapeworms (*T. taeniaformis*) and also roundworms (*Toxascaris*). Apart from three tapeworms the stomach contained only a little brown mucus. The rectum contained 6·68 grammes of firm brown faeces mixed with fur and smelling strongly of garlic. There was acute necrosis of the liver. Cultures from the tonsil and lung were grossly contaminated ; those from the heart, liver and spleen were sterile. 6·7 mg. of free phosphorus, equivalent to approximately $\frac{1}{10}$ grain per oz., were separated from the rectal contents.

There are several points of interest in the three cases cited above. They are three authenticated cases of poisoning in the cat, and poisoning cases in this animal are comparatively rare (only 11 in 360 consecutive cases). The first of the three includes a very full clinical history and *post-mortem* examination which again is not very common. From the analyst's point of view the location of the poison is remarkable. Had the analysis been confined to the stomach and liver (as might have happened if selected specimens and not the whole carcase had been sent in), the result would have been negative. The cases are a striking contrast to the statement in Lander that " in the case of the dog and cat at the time of death the phosphorus will either have been entirely eliminated (*i.e.*, by vomiting) or more or less completely oxidised." Finally you will note that in all three cases the animals were infected with bowel parasites, the significance of which I hope to discuss later.

Zinc Phosphide

The necessity of preserving food supplies during the war caused an intensification of the attempts to destroy rats and other vermin. Local authorities had " pest officers " or " rodent operatives " who worked mainly by means of laying down poisoned baits, sometimes with unfortunate consequences. The poison most commonly used was zinc phosphide, a grey powder which, when treated with water or dilute acids, gives off the intensely poisonous gas phosphine. We first encountered cases of poisoning by this substance in 1944 and the first recorded cases were, I believe, those reported by Dr. Hare and myself in *The Veterinary Record* the following year. It appears largely to have replaced phosphorus as a rat bait and as the Table shows, it caused losses in most of the animals and birds listed, the fowl again being the chief victim (26 out of 53 cases). In nearly all the cases received for analysis the animal or bird was found dead: in the few in which symptoms were seen during life these were reported as great thirst, staggering and inco-ordination, and gasping for breath in fowls, while in the dog and cat, vomiting, great abdominal pain and rigors suggestive of strychnine poisoning were described by the owners. In one of the cases in cattle in which three heifers died after a " pest officer " had dressed their food with zinc phosphide, one of the beasts was seen to stagger about and die within a few minutes, showing no pain. Thus from the histories of the cases we have received there is no doubt that this is one of the most rapidly acting poisons, due in all probability to the rapidity with which the phosphine gas is absorbed.

The most constant *post-mortem* lesions in birds were congestion of the lungs with dark, tarry blood, necrosis of the liver and the odour of " carbide " or acetylene in the crop and gizzard contents. In those cases in animals in which we had the opportunity of carrying out a *post-mortem* examination the congestion of the lung and necrosis of the liver were usually present but the carbide odour was rarely detected; the phosphine responsible for this odour had disappeared by vomiting, by volatilisation or by oxidation to phosphate. The chemical analysis revealed only zinc but the source of this was usually clearly indicated by a history that rat poison had recently been laid on the premises: in some cases a sample of the actual poison was sent with the carcase or specimens and its nature confirmed by analysis. In one case in the dog traces of phosphine were detected in the rectal contents only, zinc being present in the stomach wall, and in another case both zinc and phosphine were separated from a sample of vomit sent with the carcase. The following case in a cat is peculiar in that both zinc and phosphine were demonstrated in the alimentary tract and phosphine in the lung, but the history and *post-mortem* findings are fairly typical of these cases generally.

Case No. 27441.—A neutered male cat returned to its owner's house one morning and vomited some meat, which had not been given to it by the owner. Shortly afterwards it had rigors and died in a convulsion. The owner, a doctor, suspected strychnine poisoning, and if confirmed by analysis, threatened legal proceedings against a neighbour.

The *post-mortem* examination revealed a well-nourished carcase. The throat was diffusely reddened and coated with froth which extended down the trachea. There was no enlargement of tonsils or throat glands. The lungs were passively congested and intensely oedematous. The liver was pale and necrotic. The mucosa of the stomach and small intestine was diffusely congested and there was infection with roundworms (*Toxascaris*). The lumen of the stomach contained a little watery mucus : that of the small intestine showed a little chyle with a faint carbide odour. A little solid greyish black faeces was in the rectum. Cultures from the tonsil and lung gave a moderate growth of contaminants ; those from the heart, liver and spleen were sterile. Traces of phosphine (too small to be estimated with any accuracy) were demonstrated in the stomach contents, the contents of duodenum, jejunum and ileum, and the lung. Zinc was separated from the stomach contents (1/380th grain per oz.) and from the intestinal contents (1/25th grain per oz.) but not from the lung.

Zinc

In cases of zinc phosphide poisoning we attribute the toxic action to the phosphine part of the compound, and this is apt to make us lose sight of the fact that zinc itself is a poisonous metal. In many cases in which the analysis

reveals only zinc the source of it is indicated by a history that zinc phosphide has been used as a rat poison on the premises. Some of the cases we have received, however, must be classed as zinc poisoning since the history seems to exclude any possibility of zinc phosphide as the source. It is for this reason that I have enclosed the word "phosphide" in brackets in the Table. I quote the following case as one of zinc poisoning as opposed to zinc phosphide:—

Case No. 38197.—Of six horses on a farm one was found dead one morning in the stable. On the same day a second horse, in a cart, was seen to drop suddenly, give a few convulsive movements and die. About two weeks later a third horse from the same stable was seen to drop down while grazing and die in the same way. The *post-mortem* examination by the veterinary surgeon revealed no macroscopic lesions; blood and gland smears were negative for anthrax. No yew or other poisonous plants could be found in the field where the animals were running during the day. The three remaining horses appeared normal and there was no history of illness on the farm. A helicopter which was spraying potatoes was loaded up with the spray (believed to be Bordeaux mixture) in the field.

The specimens received for examination consisted of a sample of stomach contents, portions of liver, lung and kidney, and a short length of small intestine, all from the third horse that died; also samples of clover and of mixed oats and chop. The liver was cirrhotic and contained a few scattered yellowish foci up to the size of a split pea. The cortex of the kidney was pale and watery. No significant changes were detected in the lung, but the portion of bowel showed catarrh due to infection with Coccidia. Zinc was detected in the liver (1/90th grain per oz.), the stomach contents (1/150th grain per oz.) and the kidney (1/230th grain per oz.). The sample of mixed oats and chop also contained 1/230th grain of zinc per oz., but the sample of clover was free from it. No other chemical poison was detected in any of the specimens.

Following our report on these specimens we received a few days later individual samples of the oats, chaff and screenings from the materials which had been used to make the mixture of oats and chop. The sample of screenings consisted mainly of a mass of grain weevils, *Calindra granaria*, with some fine yellowish dust and a few oat husks. The veterinary surgeon stated that three sacks of these weevils were screened from 5 tons of oats. The samples of oats and chaff were negative but 1/127th grain of zinc per oz. was separated from the screenings.

No information could be obtained as to how the zinc got into the screenings. Apart from pharmaceutical preparations and zinc phosphide, the common sources of this metal are galvanised ironwork (*e.g.*, storage bins), zinc chloride "flux" used in plumbing, and paint in which zinc has been substituted for lead. Soft water will dissolve the metal from galvanised water pipes and cisterns and organic acids have the same effect on galvanised food bins which are widely used. A possible explanation in the present case would be that the action of the weevils on the oats gave rise to acid breakdown products which attacked and dissolved the galvanising of the storage bins, but there was no history of such bins having been used on this farm.

Cases of zinc poisoning of this type, though rare in the literature, have been reported before. Lander refers to two cases, one of illness in cattle due to drinking water containing 1½ grains per gallon, and one of illness and death in pigs due to milk which had dissolved the metal from galvanised containers. In the present case the quantities of zinc separated from the specimens were no doubt small but you will note that the animal was also infected with at least one natural disease, namely, coccidiosis. I have no hesitation in classifying this case as one of zinc poisoning, but whether a perfectly healthy horse would be equally susceptible to the effects of similar quantities of the poison is another matter. This connection between disease and susceptibility to poisoning becomes very important in the case of salt and I shall refer to it again when I come to this substance.

The Metallic Poisons

Apart from zinc, with which I have just dealt, four metals appear in the Table and I wish to refer briefly to them. Lead was by far the most commonly encountered poison (96 cases out of 133) with arsenic a poor second (32 cases). Barium, at one time widely used as a rat poison in the form of the carbonate, was met with only three times. The high proportion of lead cases, mostly in cattle (77 cases) will, I am sure, agree with the experience of those of you engaged in cattle practice. Paint was frequently the source of the poison, but in two cases we received during the war and which I reported in *The Veterinary Record* in 1943, the trouble was due to a salvaged monkey nut meal heavily contaminated with lead (possibly molten lead metal) from "blitzed" buildings. The classical symptoms of lead poisoning—apparent blindness, grinding of the teeth, abdominal pain, periods of violence alternating with semi-coma, and death in convulsions—were described in many of the case histories: in others the animal was found dead. So much literature has been devoted to poisoning by this metal that I do not propose to quote any cases in detail, but I do want to emphasise the fact that symptoms suggestive of lead poisoning can be caused by natural disease. I illustrate this with the two following cases:—

Case No. 22231.—Three calves died suddenly, showing brain symptoms—a tendency to move in circles, standing with the head pushed into a corner, and partial blindness. Two others were showing partial blindness. The diet consisted of a gruel of "calf milk," and mangolds, middlings, oats, linseed cake, hay and water. The veterinary surgeon suspected lead poisoning.

The *post-mortem* examination of one of the dead calves revealed marked emaciation, advanced anaemia, generalised oedema, degeneration of the liver and catarrhal enteritis due to coccidiosis. Cultures from the various organs were sterile and no evidence of any chemical poison was detected on analysis.

Case No. 29431.—An Ayrshire calf, after refusing to eat its meal, developed a violent "fit" with much bellowing and died shortly afterwards. The calf's twin sister had died in the same way the day before. The veterinary surgeon found septicaemic lesions on *post-mortem* examination of both calves. He suspected lead poisoning but could find no obvious source of lead.

The specimens received for examination consisted of portions of liver, spleen, lung, kidney and small intestine, and a bottle of stomach contents. The liver, kidney and lung showed a marked anaemia and there was a catarrhal inflammation of the piece of bowel due to coccidiosis. No chemical poison was detected on analysis.

The Organic Poisons

Of the 85 cases in this group no less than 76 were due to strychnine and 72 of these were in dogs. Under the Poisons Rules, 1935 (Rule 15), the retail sale of strychnine is prohibited except for the purposes of dispensing as an ingredient of a medicine. Two exceptions to this rule were subsequently made: it is now possible to purchase up to 4 oz. of this poison on demand for the purposes of destroying seals and moles. A farmer can obtain strychnine from his local chemist for destroying moles on presentation of a certificate signed by the local Agricultural Officer and stating that it is required for the destruction of moles. From the point of view of protecting animals from the dangers of strychnine poisoning this exception virtually renders the Poisons Rules useless: since its introduction strychnine poisoning has constituted a high proportion of toxicological practice. You will see that of the 360 cases in the Table, just over one-fifth are due to this poison, only lead being responsible for more.

The symptoms of strychnine poisoning are so well known that I do not propose to describe any of our cases in detail.

I should, however, like to record the fact that in most of our cases vomiting was *not* a symptom. As a rule at *post-mortem* examination the stomach was found to contain the "bait": this was frequently a rather bulky mass of putrid rabbit carcase. Strychnine, in my experience, is one of the very few poisons which does not cause vomiting in the dog.

In spite of the symptoms being so striking, it is quite possible for them to be produced by other causes. I have already referred to the fact that zinc phosphide may cause a similar syndrome. It may also be caused by disease and I am recording the following case in detail to stress this point:—

Case No. 30836.—A Peke bitch and a pullet were received for examination, the owner having lost 13 pullets and two dogs within 10 days, the deaths occurring suddenly. The Peke was seen by the veterinary surgeon before death and he stated she was showing convulsions typical of strychnine poisoning. About 10 days previously the local War Agricultural Committee had put down poison in the field at the bottom of the owner's garden to kill moles without notifying him of its use.

The *post-mortem* examination of the Peke revealed pronounced emaciation and moderate anaemia. The tonsils were grossly enlarged and mottled red and white in colour; there was enlargement of the superior cervical lymphatic glands. The stomach contained sloppy greyish contents and was distended with gas. There was a catarrhal duodenitis due to infection with roundworms (*Toxascaris*), and both the liver and kidneys showed cloudy swelling. The *Beta-haemolytic streptococcus* was isolated from the tonsils. No evidence of any chemical poison was detected on analysis.

The *post-mortem* examination of the pullet showed pronounced emaciation with slight anaemia, oedema of the lungs, cloudy swelling of the liver and duodenal catarrh due to Capillariasis. The crop was filled with sloppy mash and grass; the gizzard contained triturated food with grass and grit. No evidence of strychnine was detected on chemical analysis, but 2·74 per cent. of salt (calculated as sodium chloride) was found in the crop contents.

The examination thus showed that the deaths of the dog and the fowl were due to different causes, neither of which was strychnine poisoning. The convulsions observed in the Peke were a form of spasmophilia, a condition which frequently arises when the B.H.S. infection is complicated by bowel parasites. The deaths in the fowls were due to salt poisoning. The coincidence of the two causes acting contemporaneously coupled with the history of the laying of a poison for moles gave a picture so suggestive of strychnine poisoning that few veterinary surgeons would have had any doubts about it.

Salt

I come now to the last group which, apart from a single case of sodium fluoride poisoning in pigs, is represented in the Table entirely by cases of salt poisoning. The poisons so far dealt with have this in common—their presence in the animal body (except possibly in mere traces) must be regarded as abnormal. Salt, on the other hand, is not only a normal body constituent but an essential one, and, furthermore, one the concentration of which is kept within fairly narrow limits. In many toxic conditions a deficiency of salt is one of the symptoms and is corrected by the administration of saline *per os*, *per rectum* or subcutaneously. The provision of salt licks for cattle is evidence that salt deficiency was recognised long before the enormous expansion of biochemistry during the last 20 years. The effects of excessive amounts of salt were also recognised: many cases of salt poisoning in pigs and fowls have been reported in the veterinary literature of the past 50 years. Considerable confusion, however, has arisen on account of the fact that experimental attempts to produce salt poisoning have almost invariably failed. Slavin and Worden (1941) failed to produce typical symptoms in pigs either by adding sodium chloride to the feed or by dosing with salt solution, and Worden, in an annotation following this report, reviewed the literature on the subject, including a number of experimental attempts to reproduce the natural syndrome. None of them was successful in setting up salt poisoning as we see it in practice and this has led to the suggestion that so-called salt poisoning is really due, not to salt, but to some other more toxic substance. The explanation of this discrepancy between clinical experience and controlled experiment would appear to be that the conditions under which the salt is ingested and the state of health of the animals ingesting it may be vital factors in influencing the effect of the dose. It is significant that in one of the experiments quoted by Worden the authors (Marq & Devuyst) found that "cases of experimental poisoning were difficult to obtain except where secondary disorders were present." The following cases are quoted to illustrate the part played by feeding methods and co-existing disease.

Case No. 8790.—The history of this case, which was received after the *post-mortem* examination had been carried out, was that one or two pigs were reported to have "fits." They stood about shivering or tried to butt other pigs. They were then receiving a diet of pig meal to which 33 per cent. sugar beet pulp and 1 per cent. mineral mixture had been added (sample No. 2) but they had not cleared it up by the afternoon, so they were given a mixture of 28 lb. bean and barley meal, 28 lb. ground oats, 56 lb. bran and 5 lb. fishmeal which was fed with steamed potatoes. They had not cleared this up by the following morning, when they were given some more, and it was subsequent to this second feed that five of the pigs died. Since then the remaining 17 pigs were fed on sample No. 2 without any further trouble. Some three weeks earlier a single pig had died and following the suggestion of salt poisoning an examination of the mineral mixture revealed large pieces of salt.

The *post-mortem* examination of one of the five dead pigs (a store) revealed anaemia, acute oedema of the lungs and a stomach filled with a mass of sour-smelling food containing a high proportion of potato. Cultures failed to reveal any bacterial infection. Analysis showed 0·35 per cent. of salt in the stomach contents; no evidence of any other chemical poison was found. Food sample No. 1 contained 0·53 per cent. of salt and sample No. 2 0·58 per cent. (all calculated as sodium chloride).

The significant point in this case was the fact that the meals were fed in the dry state. This, with the unnecessarily high salt content, caused excessive drinking, fermentation in the stomach and dyspepsia. The result was a grossly overdistended or "blown" stomach, the pressure of which led to acute heart failure (syncope) and acute oedema of the lungs.

Case No. 18227.—Of a litter of nine 12-week-old pigs one was found dead and three staggering or, when lying on their side, galloping with their legs and salivating. They had all appeared well the previous evening when fed on swill and home-grown oatmeal. Rat poison had been laid on the farm some weeks previously. A *post-mortem* examination of the dead pig by the veterinary surgeon revealed the stomach full of feed but no obvious cause of death. Two more pigs then started staggering about and bumping into the sty wall. The symptoms were very pronounced: the head was held down, the animals standing in the corner attempting to vomit but merely salivating, sometimes running backwards until they hit the wall, and apparently unable to see. One of the affected pigs was shot and sent for examination.

The *post-mortem* examination revealed a moderate degree of emaciation and anaemia. The fundus of the stomach showed a thickened opaque reddish mucosa and the pylorus was catarrhal. The remains of the evening meal, which was coated with viscid mucus and about half filled the stomach, was composed of swill (potato, beans, french beans and some chop) of rather dry consistency. Similar dry swill was found in the small intestine which was catarrhal due to infection with *Strongylus* species of worms. The liver showed a few irregular foci of early necrosis. There was a bronchopneumonia of the lungs due to *Metastrongylus* infestation. Cultures from the tonsils were heavily contaminated: those from the internal organs were sterile. The stomach contents contained 0·58 per cent. of salt (calculated as sodium chloride). No other chemical poison was detected.

Subsequent enquiries by the veterinary surgeon elicited the fact that 14 lb. of salted beans had been mixed with about 30 lb. of cabbage and bread swill, and about half of this mixture plus a few pounds of meal had been fed to the nine young pigs. The remainder had since been thrown away and was not therefore available for analysis.

Apart from the clinical description of the affected animals, which is fairly typical of salt poisoning, the above case is an example of the effect of salt on pigs affected with natural disease. I should like to refer briefly to one more case of this sort:—

Case No. 41590.—The only history in this case was that a number of pigs had died suddenly, the one symptom observed being diarrhoea. The materials sent for examination consisted of the stomach and contents and portions of liver and bowel. The stomach was anaemic and contained 350 grammes of swill. No macroscopic change was detected in the liver but the small bowel showed a chronic catarrhal enteritis due to coccidiosis. The stomach contents contained 0·33 per cent. of salt. No other chemical poison was found.

Here we are dealing with an animal with chronic enteritis. I am satisfied that salt brought about the death of this diseased pig, but I am not prepared to assert that a similar dose would have killed a perfectly healthy pig.

You will notice in the three cases quoted that in none of them does the salt content reach a very high figure. In the fowl it is not unusual to get 5 or 6 per cent. of salt in the crop contents: in some of our cases it has been over 7 per cent. I believe this is due to salt being much more rapidly absorbed from the pig's stomach than it is from the fowl's crop. The amount of salt found in the pig's stomach after death may thus be considerably lower than the amount in the food as eaten, although one would not be surprised at death occurring with a comparatively small dose when the animal is already diseased. The importance of natural disease in salt poisoning is emphasised by the fact that of the 25 cases listed in the Table, 21 comprised a complete carcase or a fairly wide selection of specimens from the organs, and of these 21, 15 (nearly three-quarters) showed the presence of natural disease. A chemical analysis alone therefore is not a sufficient basis for the diagnosis of salt poisoning, particularly in pigs. All the circumstances of the case, the method of feeding, and the presence or absence of disease, as well as the chemical analysis, must be considered in forming an opinion.

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So far I have dealt with this series of cases by discussing the more important poisons individually. I should like to conclude by considering the cases as a whole. I have already pointed out, in discussing zinc and salt, that pre-existing disease can render an animal more susceptible to the effects of a poison. There is, however, another equally important connection between the two. In describing the cases of phosphorus poisoning in the cat I drew your attention to the fact that in all three cases the animal was affected with bowel parasites. One of the most constant effects of these bowel infections is the development of pica or depraved appetite. The animal seems to have a craving for putrid or decaying animal matter, a fact which is responsible for the creature repeatedly reinfecting itself via its own faeces or those of other infected animals. This pica is responsible in many, if not all, cases for a dog's eating the putrid remains of a rabbit or a decomposing fowl dressed with strychnine or other vermin killer. Thus natural disease is an important contributory cause of poisoning either by rendering the animal more susceptible to the effect of the poison, or by producing a pica which induces the animal to eat a bait which the healthy animal would ignore. The high proportion of poisoned animals that are diseased is significant: of the 360 cases we are dealing with, we had the opportunity in 187 of carrying out a *post-mortem* examination or of examining specimens from a number of the tissues and organs, and of these 187 no less than 118 (approximately 63 per cent.) showed evidence of active natural disease; in a few of them two infections were found in addition to the chemical poison. The co-existence of disease with poisoning must therefore be regarded as the rule rather than the exception.

The final point I wish to make about these 360 cases is the very few examples of plant poisoning among them. With the exception of the five cases due to taxine (from yew) and two of the solanine cases in which the source was woody nightshade, all were caused by prepared or manufactured materials. It would appear that poisoning by plants is of comparatively little importance *in this country*, and that the most important cause of poisoning is the careless use or disposal of toxic substances. The careless use of sheep dips and other poisonous insecticides, the laying of rat baits without due precautions being taken against their being or becoming accessible to domestic animals, the careless disposal of old paint tins, the use of so-called "unrationed" foods without a satisfactory enquiry as to their harmlessness—in fact, human negligence—is mainly responsible for these losses. Indeed, even the cases of yew poisoning might be attributed to this cause since it is surely gross negligence to omit to fence off from livestock such a well-known poisonous tree.

These losses due to poisoning must be very considerable and one would like to end with some positive suggestion as to how they could be reduced. On the basis of the inferences I have drawn from this series of cases I offer you this suggestion: that the most profitable measures to adopt for this purpose would be (1) the bringing home to those who handle these poisonous substances the realisation of their responsibility in using and disposing of them safely, and (2) the elimination or reduction of disease, particularly parasitic infestations, by the regular inspection of livestock, with the resulting early diagnosis and treatment; in other words, the application of the principles of preventive medicine.

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A.I. CATTLE BREEDING IN ESSEX

An enrolment of 400 new members, bringing the total to over 2,000, was reported at the annual meeting of Writtle Cattle Breeding Centre held at Chelmsford.

The Veterinary Officer, Mr. J. Smith, M.R.C.V.S., stated that during the year ended in March 16,000 cows were inseminated, this representing 24·6 per cent. of the total cow population in the area of the centre's operations. Of these, 5,303 were cows in recorded herds. This was 37·4 per cent. of the total figure, compared with the national average of 17·1 per cent. The breed differences in demand were: Friesian 8,041, Dutch Friesian 672, Ayrshire 2,197, Shorthorn 1,855, Jersey 1,826, Guernsey 1,017, Red Poll 368, beef 533. Conception rates showed an overall average of 65·8 compared with 63·4 in the previous year.

Between mid-November and April two waves of foot-and-mouth disease struck Essex, and as a result the artificial insemination service had to be suspended in portions of their area for as long as three weeks, but fortunately neither of the strikes occurred during the peak breeding period from mid-December to early February.

The Chairman (Mr. J. A. Roberts) said artificial insemination continued to grow throughout the country and 706,829 cows were inseminated at Milk Marketing Board centres during the year just ended. Half the registered milk producers were now members of these centres. Practically all this growth had taken place in the past seven years.

STUDIES IN TUBERCULOUS SENSITIVITY IN THE PIG

III. The Tuberculin Skin Reaction in the Sow

BY

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The experimental work so far reported indicates that a high degree of sensitivity may readily be established following infection with either bovine or avian tubercle bacilli (Luke, 1951a). Nevertheless, evidence was put forward to show that such sensitivity did not necessarily persist and there was a tendency in the older infection for it to wane and even disappear (Luke, 1951b). Testing results, therefore, are likely to be influenced by the age of the lesions, and complete loss of sensitivity is to be expected in some cases where the natural resistance of the host has overcome and destroyed the infecting bacillus (*vide infra*).

In order to investigate this aspect of the problem it was decided to test a group of old sows. It is to be expected that among a group of infected sows a proportion would represent a long-standing infection dating from the pre- or post-weaning period. Pigs usually acquire bovine infection through the ingestion of infected skim milk and under normal conditions of pig husbandry this is most likely to be fed in the late suckling or immediate post-weaning period. The acquisition of avian-type infection is mainly by ingestion of food, etc., contaminated by open cases of tuberculosis in the fowl. This, of course, may occur at any time during the pig's life, but the experimental evidence points to the fact that such avian infections "age" comparatively rapidly and such sensitivity tends to wane fairly quickly. Under experimental conditions in recent infections a satisfactory measure of skin sensitivity can be demonstrated using standard retest Weybridge tuberculins diluted 1:1,000. Twenty-five sows were tested with Weybridge retest tuberculins diluted 1:1,000, and 100 sows tested with undiluted Weybridge tuberculins. A comparative test was carried out in all cases. The test site was a fold of skin at the base of the ear. Mammalian tuberculin was injected into the right ear and avian tuberculin into the base of the left ear.

The sows used were selected at random from those passing through Belfast Abattoir for slaughter. Their exact age was unknown. Most of these sows are discards from breeding herds on account of loss of fertility and it is estimated that the majority would be three or more years old.

Procedure.—0·1 ml. of tuberculin was used as the test dose in all cases. The sows were confined in groups of three to four in small pens and it was found possible to measure the ears and inject the tuberculin without additional restraint. The skin was measured before injection and again 24 hours later prior to slaughter. All measurements were made by the author in order to reduce any possible margin of error. It was not possible to retain the sows for observation longer than 24 hours and for this reason the data presented may be open to some criticism. However, as the result of considerable experience in experimental infections it is evident that the 24-hour and 48-hour skin measurements do not differ significantly in the positive animal. In some cases it is true that the 48-hour measurement may be greater than that taken at 24 hours, but even in such cases the 24-hour reaction left no doubt as to its positive character. In other cases the 48-hour measurement may be even less than that taken at 24 hours. It is felt, therefore, that these 24-hour results recorded here are sufficiently reliable to enable an assessment of the data to be made.

After slaughter the carcase was subjected to a careful examination for lesions of tuberculosis. All lesions were examined microscopically and culturally and a biological test was carried out on guinea-pigs and rabbits. Under the conditions in which the material was collected it was not possible to ensure complete asepsis and the lesions were treated with oxalic acid after the method of Corper and Uyei (1929) prior to seeding on culture tubes and animal inoculation. Cultures were seeded on Dorset's egg medium and three tubes with and without glycerine were used in all cases.

Results and Discussion

Of the 25 sows inoculated with the dilute tuberculins six had lesions at *post-mortem* examination. From the skin responses obtained with the dilute tuberculins it was obvious that the sensitivity exhibited by these sows was of a very low order. Of the six pigs with lesions at *post-mortem* examination, two showed no rise in skin thickness, two showed a 2 and 3·5 mm. rise to avian tuberculin, one showed a 2 mm. rise to mammalian and one a 1 mm. rise to mammalian tuberculin. Of the six lesions, five were in the mesenteric gland and one in the bronchial gland. Microscopically four were positive and two negative. Culturally all were negative and only one was positive biologically for the guinea-pig. This particular sow showed only a 2 mm. increase in skin thickness to the mammalian tuberculin.

In considering the results of the 100 sows tested with undiluted tuberculin, difficulty was experienced in establishing a criterion of what should constitute a positive reaction in view of the disparity between the skin responses and the *post-mortem* examination results. Finally, it was decided to base interpretation on a skin increase of 2 mm. or more as a positive reaction. In the pig reactions of this order are more readily apparent on palpation than the actual measurement would suggest. On this criterion 39 sows reacted and, of these, 22 showed visible lesions at *post-mortem* examination and in 17 no evidence of tuberculosis was found. Of the reactors 22 fell within the 2 to 5 mm. rise group, 12 gave reactions between 5 and 10 mm., three had reactions between 11 and 15 mm. and two showed increases over 15 mm. The maximum increase recorded was 16 mm. In addition, eight pigs showing lesions had skin reactions within the range 0 to 2 mm. Of these, three showed no rise, two showed increases of 1·5 mm. (one to avian and one to mammalian tuberculin), one gave a 1 mm. rise to mammalian tuberculin and two were recorded with 0·5 mm. increases in skin measurement. One of these reacted to mammalian and one to avian tuberculin.

Of the 22 reactors showing lesions, 13 reacted to mammalian tuberculin, six to avian tuberculin and three had a dual sensitivity. A dual sensitivity was one where a positive reaction occurred to both tuberculins and the measurements were within 1 mm. of each other. Of the 13 mammalian reactors, two fell within the 2 to 5 mm. rise group, seven within the 5 to 10 mm. group, two within the 10 to 15 mm. group and two showed reactions over 15 mm. All six avian sensitivities fell within the 2 to 5 mm. group. Of the three dual sensitivities, two came within the 2 to 5 mm. group and the third within the 5 to 10 mm. group. Of the 17 reactors without lesions, three avian and 10 mammalian reactions fell within the 2 to 5 mm. group, one avian and two mammalian reactions were in the 5 to 10 mm. range and one avian reaction measured 10·5 mm.

The lesions were distributed as follows. In 21 cases the mesenteric glands were affected, the head glands on 12

occasions, the bronchial glands four times, the gastric glands on two occasions and the liver once. Only two cultures were positive and biologically three guinea-pigs were positive, two of the latter being from the culture-positive lesions. Of the reactions from which the three positive guinea-pigs were derived, all were to mammalian tuberculin, being 5·5, 8 and 11·5 mm. respectively.

From these results the difficulties of accurate interpretation of the test are obvious as no matter what criterion one takes as a positive reaction, the percentage error comparing test results with *post-mortem* findings is great. The problem here is one of loss of sensitivity and such being the case, no test which depends for its action on the presence of sensitivity alone is likely to be consistent with *post-mortem* findings in older pigs. It is interesting to note that out of 39 reactors, only three proved positive to biological test, indicating that in the older pig the majority of infections have been overcome and viable organisms no longer exist in the lesions. None of the positive reactors exhibited a very high degree of sensitivity and one of the biologically positive cases showed a skin increase of 5·5 mm. only. From the epidemiological point of view the significance of the failure of such sows, showing lesions of tuberculosis, to react to the tuberculin test is reduced when one bears in mind the ability of the pig to overcome and apparently sterilise existing lesions—though the test of fitness for human consumption of carcase pig meat at present must remain one of presence or absence of lesions, irrespective of the viability of such lesions.

It may be argued that taking a 2 mm. rise in skin thickness as the criterion of a positive reaction is unduly severe, but it is emphasised that even on this basis, eight pigs showing lesions gave a reaction of 2 mm. or under. If one takes, for example, a 5 mm. rise as the basis of a positive reaction then the number of animals with lesions giving no reaction increases to 14. None of these 14 animals showed evidence of viable organisms, however, and for testing under field conditions a 5 mm. or more level might be used as a basis for classifying positive reactions. The fact, however, that one of the biologically positive cases showed an increase of 5·5 mm. only indicates the need for caution and it may be necessary to establish a "doubtful" category for those animals showing rises of 2 to 4·5 mm., such animals to be retested in, say, six weeks' time; the results of the two tests may enable the status of the sensitivity to be assessed more readily. The objections to such "doubtful" categories in testing schemes are well appreciated but such may be justified on economic grounds or in the case of valuable breeding stock.

The status of the no-lesion reactors (false positives) is difficult to assess. Taking an increase of 2 mm. or more as constituting a positive reaction, 17 pigs reacted but no lesions were found at *post-mortem* examination. On the other hand, taking a rise of 5 mm. or more as constituting a positive reaction, only five pigs would fall into this category. These findings suggest that under practical conditions the 2 mm. criterion is too severe and the increase of 5 mm. or more would be a more equitable basis for assessing positive reactions. However, there is evidence that the latter criterion may involve a fairly large number of false negatives, *i.e.*, pigs showing lesions at *post-mortem* examination but giving skin reactions between 2 and 4·5 mm. In the present group of sows six pigs fell within this category. This fact also suggests the need for assessing reactions between 2 and 4·5 mm. as doubtful and such pigs to be retested at a later date.

In this series the number of pigs without visible lesions giving small reactions to tuberculin is high. This may suggest that a slight degree of non-specific sensitivity is common, but, on the other hand, some of these may represent residual sensitivities from abortive infections.

Summary

The tuberculin test results in a group of 100 sows are presented. The difficulties of establishing a satisfactory criterion of a positive reaction are discussed. Lesions were found in 22 sows and yielded positive biological tests in three cases only.

Acknowledgments.—The author's thanks are due to Mr. A. McLean and Mr. J. Stratford for providing facilities at Belfast Abattoir for carrying out the testing, to Professor Lamont and Dr. Kerr for their helpful criticism and to Mr. T. Cahill for technical assistance.

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CLINICAL COMMUNICATION

SULPHUR POISONING IN CATTLE

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Subjects.—Group of 24 Shorthorns, heifers and bullocks, 18 months to two years old.

History

The owner complained that several beasts in the group were ill and were scouring badly on February 24th, 1952. The history was that the beasts had been given sulphur as a tonic the previous day, the intention being to give each animal 3 oz. of pure flowers of sulphur.

The animals in this case were kept in yards at night, fed some crushed oats in the morning, then turned out to hay in the field. On their return to the yard at night each animal was given approximately 10 lb. of brewers' grains.

On Saturday, February 23rd, 1952, sulphur was mixed with the warm wet brewers' grains. The mixing must have been carelessly carried out for the animals to have consumed a toxic dose.

The animals appeared to be slightly dull on the night of the 23rd, but the owner was not alarmed ; the next day, however, scouring was marked in some of the animals and one (G.10) was in a state of shock, while two others (H.17 and G.30) were quite ill.

This was the position when I arrived on Sunday, February 24th, 1952, about 4 p.m.

Symptoms and Preliminary General Examination

About half the animals were scouring, three of them appearing worse than the others. The first and most seriously ill was a white Shorthorn bullock (G.10), 18 months old and weighing about 5 cwt. It was standing still, was easily held, and appeared very dull. It was not in very good bodily condition.

Respirations : fast and shallow.
Pulse : fast and thready (not counted).
Mucous membranes : eye, pale and dirty looking ; mouth, similar.
Body and extremities : cold.
Temperature : 97° F.
Faeces : liquid, black and evil smelling.

H.17, roan Shorthorn heifer, 18 months old, weighing about 5 cwt., and G.30, roan Shorthorn heifer, two years old, weighing about 6 cwt. These two showed the same symptoms, though not in such a marked degree.

DIAGNOSIS. A tentative diagnosis of sulphur poisoning was made.

Differential Diagnosis.—This consisted of elimination of other poisons. The possibility of an outbreak of salmonellosis was considered, but discarded on the grounds that none of the affected animals showed any marked rise in temperature ; in fact, most showed temperatures which were subnormal.

PROGNOSIS. This was guarded with regard to the eventual outcome because I had not previously met with sulphur poisoning and was unsure of its action and ultimate effect.

In the case of G.10 prognosis was death.

TREATMENT

Having no previous experience of the condition, treatment was on general lines for irritant poisons. Each of the badly affected animals was given 1 pint of linseed oil on Sunday afternoon, February 24th, 1952, and daily while it lived.

G.10, in addition, was isolated and given 2 pints of milk and 4 c.c. of " carbachol."

COURSE

G.10 died at 8 p.m. on February 24th, 1952.

H.17 died on February 25th, 1952, in the morning.

G.30 died on February 26th, 1952, in the morning.

NFDX6, a red ×-Guernsey bullock, 18 months old and weighing about 5 cwt., was noticed dull and listless on Tuesday; it appeared to pick up, then died rather unexpectedly on Friday, February 29th, 1952.

No. 6, roan ×-Shorthorn heifer, 18 months old and weighing 5 cwt., and No. A red Shorthorn bullock, 18 months old and weighing 5 cwt., began to show symptoms similar to the others and died on Monday, March 3rd, 1952.

The remainder of the group have quite recovered.

Post-mortem EXAMINATION

Three of the animals which died were subjected to *post-mortem* examination, the findings being as follows :—

G.10

Mucous membranes, pale and dirty ; the blood was a dull reddy-blue colour.

The abomasal mucous membrane was inflamed and a very few specks of sulphur were found in the contents. The rest of the stomachs and bowels looked normal ; there was no smell of H S. The mesenteric lymph nodes were normal in size. Liver, spleen and kidneys appeared normal. The lungs were congested.

The Heart.—Slight petechiation was found on the epicardium and some straw-coloured fluid was found in the pericardial sac. The left ventricle was dilated and the right ventricle was contracted. All the chambers were completely empty. The endocardium was smooth and shiny.

It was felt at the time that the "carbachol " may have produced or had an influence on the production of this picture, but, as will be seen, the heart was exactly the same in two others post-mortemed, although they had not been given " carbachol." No samples were taken from this animal for analysis.

G.30

Post-mortem findings were almost exactly the same as in G.10, though the liver was congested and there was more petechiation of the epicardium. The left ventricle was dilated and the right contracted, while all chambers were empty as in G.10. Samples were taken for analysis.

NFDX6

In this animal the mucous membranes of the abomasum and small intestine were very inflamed. Sulphur was noted in the contents of abomasum and rumen. There was quite a lot of straw-coloured fluid in the abdominal cavity. The liver was yellow and " toxic " looking, as were the kidneys. The spleen was normal in size.

The lungs were abnormal, being congested and consolidated in parts and were slightly yellow in colour. There was no smell of linseed oil. The heart presented the same picture as the others.

ANALYTICAL RESULTS

Samples of visceral contents were submitted to the Hygiene Department of the Royal (Dick) School of Veterinary Studies for toxicological analysis but no abnormal substance could be detected apart from the presence of considerable quantities of sulphur.

Quantitative determinations of the element gave the following results :—

Animal number	Date of sample	Source	Sulphur content, per cent. dry matter
G.30 ...	27.2.52	Stomach contents	0·07
NFDX6	1.3.52	Rumen	0·18
		Stomach (1)	0·06
		Stomach (2)	0·04
No. A ...	4.3.52	Rumen	0·21
		Stomach	0·17
No. 6 ...	4.3.52	Stomach	0·55

Assuming that the rumen was reasonably full, containing some 20 to 25 gallons of material with a water content of about 65 per cent., these figures would suggest that there was still some 3 oz. of sulphur present when examined in the laboratory in addition to what was present in the remainder of the alimentary tract and what had been absorbed or excreted. It is obvious, therefore, that the animals had had access to more than the intended 3 oz. per head and the absence of other poisons plus the resemblance of the symptoms to those previously recorded in sulphur poisoning would seem to substantiate the diagnosis.

DISCUSSION

Giving sulphur to animals as a general " tonic " is, apparently, a well-established custom in certain parts of England and in principle is sound. Steyn (1934) carried out an experiment using one heifer and three oxen, three years old. He kept the heifer as a control and fed the others 15, 30 and 45 grammes of sulphur respectively, six days out of seven, for quite a long period, finding that the oxen gained much more weight than the heifer. He concluded that one could feed 30 grammes (1 oz.) daily with safety and advantage.

In view of Steyn's findings the amount given—3 oz.—would appear to be rather high, but a similar dose had been given to other animals on the same farm with no apparent ill effect. In this instance the sulphur was mixed with crushed oats in which, being dry, a more even mix was possible. In view of this I think it is fairly safe to assume that the animals which died consumed much more than 3 oz. —probably 6 oz. or more.

This case is reported to emphasise the care which must be used in the administration of sulphur, especially to large numbers of cattle, and because there is very little in the literature regarding sulphur poisoning in cattle.

(Concluded at foot of column 1, page 347.)

ABSTRACTS

Continuous Phenothiazine Therapy for Horses*

This experiment commenced in 1948 and included 12 horses 2 to 18 years old, which were placed on four different levels of phenothiazine—0·5 gramme to 4·0 grammes—fed daily in the grain ration. Complete *post-mortem* examinations were carried out after one and two years of continuous phenothiazine therapy. At the end of two years no harmful effect had emerged, and the numbers of strongyle worms carried by the horses had been reduced significantly.

For the third treatment year the four remaining horses were fed 2 grammes phenothiazine daily, and a table is given showing the complete worm egg counts which were carried out at monthly intervals. From this table it would appear that the only completely negative count was from an 11-year-old mare which was fed 4·0 grammes phenothiazine for two years, followed by 2·0 grammes for one year. All the others showed small infestations. The author considers this to indicate failure of a worm species to develop an immunity to phenothiazine, which one might read into the records of the other horses.

W. L. S.

* **Continuous Phenothiazine Therapy for Horses : IV.—The Third Year of Treatment.** Todd, A. C. (1952.) *Vet. Med.* **48.** 25-26.

* * * * *

Erythrocyte Antibodies as a Cause of Abortion in Cattle*

Having in mind the possibility that haemolytic disease of the foetus or of the new-born might occur in cattle, the authors tested the sera of cows from several herds against the red blood cells of bulls to which they were, or had been, in calf. In one herd, where a large number of abortions had occurred which had not been accounted for after thorough investigation, six out of 44 sera were positive. In a second herd, where there had been long irregular oestrus cycles but no abortions, four out of 10 sera were positive. In a third group of nine cows, which were infertile but had regular oestrus cycles, one of the sera was positive. In a fourth herd, where 10 cows became pregnant at the first insemination from the same bulls that were used in the second and third herds, one serum only was positive.

In the experiments which next are described, four cows aborted after they had been given a series of transfusions of blood antigenically different from their own ; the blood used for the transfusions was taken either from the bulls to which they were pregnant, or from bulls whose blood was antigenically similar to it. The physical reaction to transfusion was slight, and it seemed that the abortions might have arisen as a result of a reaction in the cotyledons or of the transfer of erythrocyte antibodies from the maternal to the foetal circulation. The erythrocyte antibodies were found to become concentrated in the colostrum of the cows, and were transferred to a calf's blood by feeding colostrum during the first two days of life.

E. C.

* **Erythrocyte Antibodies as a Cause of Abortion in Cattle.** Laing and Blakemore. (1951.) *Nature.* **168.** 656.

Harvey (1924) reports that 8 oz. of sulphur killed a heifer in 48 hours, but gives no information as to the *post-mortem* findings.

Acknowledgments.—I am greatly indebted to Messrs. J. D. Peele, R. Richardson and Professor A. Robertson for help in the preparation of this article.

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ROYAL COLLEGE OF VETERINARY SURGEONS

Result of Council Elections, 1952

At the annual general meeting of the Royal College held on Wednesday, June 4th, the following result of the Council elections was declared :—

Elected—

1st	Gould, G. N.	931
2nd	Barker, J. R.	916
3rd	Wooldridge, G. H.	914
4th	Smythe, R. H.	896
5th	Boddie, G. F.	832

Not elected—

6th	Wright, T. L.	751
7th	McKinna, W. R.	681
8th	Sumner, H.	671
9th	Uvarov, Miss O.	485
10th	Rowlands, W. T.	433
11th	Fenn-Smith, G. K. ...	220

The total number of voting papers received was 1,734, of which 163 were returned by overseas members, and 32 voting papers of the total were declared invalid for such reasons as failure to sign the ballot paper or voting for too many candidates.

Of the five elected candidates, four are previous members of Council who were standing for the election and one, Mr. R. H. Smythe, is a new member.

A Large Poll

The Registrar, R.C.V.S., points out that this is the biggest poll for many years, possibly ever. The figures show that the Council's policy of having a long period in which members can return their ballot papers has been successful not only in raising the voting at home but also in enabling overseas members fully to participate in the election. The overseas ballot papers have been received from every part of the world, including the most remote areas, most of which under the system in force when the Registrar arrived normally were debarred from participation in the election. The following figures may be of interest :—

Year	*Number of Votes Cast*		
1952	1,702, of which 163 were overseas, plus	32	invalid
1951	No contest		
1950	1,534, of which 167 were overseas, „	32	invalid
1949	1,466 }	27	„
1948	1,102 } Figures for overseas „	11	„
1947	904 } not available „	8	„
1946	1,208 }	13	„

REVIEW

["Dogs and their Management," originally written 1858 by Mayhew; Fourth Edition revised and largely re-written by Major W. HAMILTON KIRK, M.R.C.V.S.; pp. 288. Routledge & Kegan Paul, Ltd, Broadway House, Carter Lane, London, E.C.4. Price 14/- net.]

Major Hamilton Kirk has in the main succeeded in bringing this old friend up to date and he provides much useful information in very readable form. The voice of experience speaks throughout the book and its contents will give much enjoyment to readers.

Inevitably, one is left with some confusion of mind as to whether the substance is intended for novice laymen or for professional persons. The early part suggests the former, but, for example, not all of the latter would to-day agree with "strychnine by hypodermic injection" for collapse in the dog and few of the former will repeat the performance, even were they to procure and guess at the approximate dose.

But perhaps the greatest disappointment one gets is in the absolute silence of the author on so-called "hard pad" disease. Distemper and its complications are well described and sensibly treated. Dog owners of 1951-52 have, however, come to regard "hard pad" disease as the "villain" of distemper-like diseases and failure of the author even to mention it is surely an error of judgment.

There are minor omissions which could well have been included, *e.g.*, intravenous saturated magnesium sulphate as another means of painless death, but these things excepted, there is much to be recommended in this nicely published book, with its sound advice, its meaty technical chapters and its sparse but good illustrations.

NOTES AND NEWS

Diary of Events

June 11th.—Meeting of the R.A.V.C. Division of the B.V.A., at the R.A.V.C. Laboratory, Thornhill, Aldershot, 3 p.m.

June 11th.—Joint Meeting of the South-Eastern and Sussex Divisions, B.V.A., at the Wellcome Veterinary Research Station, Frant, Tunbridge Wells, 2.30 p.m.

June 11th.—Meeting of the Scottish Metropolitan Division, B.V.A., at Dunblane (Dunblane Hydro Hotel), 2 p.m.

June 12th.—Annual Meeting of the R.A.V.C. Golfing Society, at the North Hants G.C., Fleet.

June 13th.—Annual General Meeting of the Lincolnshire and District Division, B.V.A., at Grantham (The George Hotel), 2.15 p.m.

June 13th.—R.A.V.C. Officers' Club Annual Dinner, at Grosvenor House, London.

June 19th.—Herts and Beds Division, B.V.A., Summer Meeting at Luton, 2.45 p.m.

June 19th.—Meeting of the Western Counties Division, B.V.A., at Exeter (Imperial Hotel), 2 p.m.

June 25th.—B.V.A. Meetings at 36, Gordon Square, London, W.C.1—Grassland Conference Sub-committee, 10.45 a.m.; Technical Development Committee, 2 p.m.

Sept. 8th—13th.—Seventieth Annual General Meeting and Congress of the British Veterinary Association, at Harrogate.

R.C.V.S. EXAMINATIONS

June 26th/27th.—R.C.V.S. Membership Written Examinations.

COUNCIL AND COMMITTEE MEETINGS OF THE B.V.A.

The next quarterly meetings will be held in London on July 21st, 22nd and 23rd, in the following order:—

July 21st.—Monday, 12 noon, Parliamentary and Public Relations Committee; 2.30 p.m., Organising Committee.

July 22nd.—Tuesday, 10 a.m., Veterinary State Medicine Committee; 12 noon, Home Appointments Committee; 2 p.m., General Purposes and Finance Committee.

July 23rd.—Wednesday, 11 a.m., Council Meeting.

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PERSONAL

As announced in these columns in August of last year, Mr. Horace Thornton, B.V.SC., M.R.C.V.S., D.V.H., Chief Veterinary Officer, Newcastle-on-Tyne, was assigned to the World Health Organisation for a term, his duties entailing periodic visits to various countries to assist their governments in dealing with problems connected with food hygiene and meat inspection. We learn that Mr. Thornton has now arrived in Mexico and has been welcomed by Dr. Lauro Ortego, Assistant Secretary of Agriculture and Livestock. In connection with his duties as consultant for W.H.O. Mr. Thornton plans to visit Mexican meat-packing plants under the control of the Government and inspect latest sanitary equipment and methods installed to assure hygienic production. Mr. Thornton will proceed to the United States.

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Births.—BLAMIRE.—On May 27th, 1952, at Chase Farm Hospital, Enfield, to Catherine (Rena), wife of R. V. Blamire, a second daughter.

CRIPPS.—On May 31st, 1952, to Peggy, wife of Jack H. H. Cripps, B.SC., M.R.C.V.S., of 28, Stoke Road, Guildford, a daughter—Barbara.

SCHWARZ.—On May 23rd, 1952, to Jessie (*née* Richards), wife of R. A. J. Schwarz, M.R C.V.S., Grimsby, Lincolnshire, a daughter.

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R.C.V.S. OBITUARY

BARTON, Clement Mervyn, Captain, late R.A.V.C., Red Lodge, Overslade, Rugby, Warwicks. Graduated London, December 20th, 1907. Died (following an operation) May 20th, 1952; aged 66 years.

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LEGAL NOTES

Pet Shop Proprietor Fined for Practising Veterinary Surgery

R.C.V.S. SUCCESS IN IMPORTANT PROSECUTION

Because they thought thousands of pet shops would be affected, the Harrogate magistrates took a fortnight to consider a case brought by the Royal College of Veterinary Surgeons against Frederick William Whitehouse, 39, a Harrogate pet shop proprietor.

They found Whitehouse guilty of treating a mongrel sheep-dog while not qualified. He was fined £15 with £10 10s. costs.

The case, which was described as being one of great importance to dog-breeders and owners, came before the Harrogate magistrates on May 6th, when Whitehouse, proprietor of the Pets Emporium in Beulah Street, and of an animal boarding establishment in Markington, pleaded "Not guilty" to four summonses alleging that he had practised veterinary surgery when not qualified to do so.

Mr. E. W. Fedden, prosecuting on behalf of the Royal College of Veterinary Surgeons, said that the purpose of the Veterinary Surgeons Act of 1948, under which the cases were brought, was not to protect the veterinary profession but animals. It was unlawful for anyone to practise veterinary surgery who was not qualified to do so, or was not included in a special supplementary list of persons allowed to practise.

The first three summonses were concerned with a mongrel sheep-dog, the property of Miss Jessie Norton, of Burnt Yates, and the fourth with a spaniel, also belonging to Miss Norton.

The first dog had been purchased from Whitehouse in 1950. It became ill in October, 1951, and Miss Norton asked her mother to take it to Whitehouse, to whom she described the dog's condition. Whitehouse said it seemed to be suffering from worms and sold her some worm tablets. Mr. Fedden asserted that Whitehouse had affected to diagnose a complaint from which the animal was suffering, and to prescribe treatment.

After a week the condition of the dog had not improved and Miss Norton again visited Whitehouse. According to her, he offered to go out to Burnt Yates to see the dog. The prosecution alleged that a medicine was prescribed for the animal and that the sheep-dog was alone in the room.

It was further alleged that when the sheep-dog was destroyed by Whitehouse in Harrogate he suggested that the medicine, which

he described in court as a tonic, should be given to the spaniel. Three or four weeks later the animal became ill; it was suffering from chorea and the after-effects of distemper, and was destroyed on the advice of a veterinary surgeon.

Whitehouse, in evidence, said he was reluctant to go to Burnt Yates, but, as it was a Saturday night and he would be leaving his home to go into Harrogate in any case, he stated he would call and see the dog if it was convenient to him to do so.

He did, in fact, call to see the dog. He did not touch it, but saw that it was suffering from "streaming distemper." For the sake of a pure-bred spaniel which was in the room, he advised that the dog should be destroyed. He also advised that the spaniel should be taken to a veterinary surgeon.

Whitehouse denied that he had charged for his visit to Burnt Yates. In his shop was displayed a notice saying that neither he nor his assistants were qualified veterinary surgeons, nor allowed to practise under the supplementary list, but that their advice was available to customers for what it was worth. The notice was produced in court.

Defendant said it was necessary for him to use a certain amount of his knowledge of animals when customers came to him for advice. They often told him what appeared to be wrong with their animals and he would give them the medicine which he believed would best meet their case. Pet shop owners all over the country were in the habit of carrying out this practice.

He had had experience of animals throughout his life. He first managed a boarding establishment for dogs in the early 1930s and took over the Beulah Street business in 1937.

Mr. J. Scotter, defending, said nothing could be "more unprofessional" than the way in which Whitehouse made his visit to Burnt Yates. He suggested that he was acting in a friendly way, out of courtesy to a customer, and that a parallel could be drawn between the advice his client had given to the Norton family when they called at the shop and the advice which a chemist so often gave to his customers. The chemist would sell the proprietary medicines which he considered most suitable.

Mr. Fedden said the comparison with the chemist was a dangerous one, because human beings could be treated by unqualified men, if they so desired, whereas, according to the law, animals could not be so treated.

It would be unlikely that a veterinary surgeon would be so rash as to attempt to diagnose an animal's illness on hearsay.

In fining Whitehouse, after reserving decision for a fortnight (as recorded above), the Harrogate magistrates ruled that proprietors of pet shops, unless they are qualified veterinary surgeons, must not treat sick animals.

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Conviction at Stockport

In a case recently heard at Stockport, John Mackie Smith, aged 24, whose address was given as Ashfield Road, Cheadle, was fined a total of £20 for practising veterinary surgery while not being registered as a veterinary surgeon. Smith pleaded "Not guilty."

Mr. R. H. Mais, prosecuting, said: "This man has been a source of trouble to the Royal College of Veterinary Surgeons for some time. He applied to the College to be registered and continued to practise in spite of being warned."

Evidence had showed that after a woman had paid defendant two guineas to give her dog what she thought were anti-distemper injections the dog developed pneumonia and fits and died.

Mr. J. E. Shaw, for Smith, said the first treatment Smith gave to the dog could be regarded as first-aid, which uncertificated practitioners were allowed to give.

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Foot-and-Mouth Disease

Movement Ban in 28 Counties

The ban on the movement of livestock in 28 counties of Southern England and the Midlands, imposed at the end of last week, came into force a little more than a fortnight after the lifting of the nation-wide ban. The Ministry of Agriculture stated that the restrictions in Southern England were necessary because foot-and-mouth disease in Northern France had increased and outbreaks might be caused in the more westerly counties of the south which have hitherto been free. It was emphasised that the orders did not denote any general worsening in the position.

Counties affected in Southern England are: Kent, London, Middlesex, Surrey, East and West Sussex, Berkshire, Hampshire, the Isle of Wight, Wiltshire, Dorset, Somerset and the county of Bristol. A second controlled area, covering the Midlands, will comprise the counties of Gloucester, Oxford, Buckingham, Hertford, Bedford, Northampton, Warwick, Worcester, Shropshire, Stafford, Leicester, Rutland, Nottingham, Derby and Cheshire.

Four days after all restrictions on cattle had been removed in Jersey, following a 15-day all clear, an outbreak in the island—the third in Jersey—was confirmed. Other outbreaks have been confirmed in Cheshire, Dumfriesshire, Isle of Wight, Kent, Oxfordshire, Staffs, Sussex and Wiltshire.

The Directors of the Royal Highland and Agricultural Society of Scotland decided at a meeting in Edinburgh to cancel all classes for cattle and other cloven-hoofed animals at the Royal Highland Show at Kelso because of foot-and-mouth disease; the Council of the Three Counties Agricultural Show decided at Worcester to omit cloven-hoofed classes of livestock from the show, while Leicestershire Agricultural Society's two-day show, which was to have been held at Market Harborough on June 13th and 14th, has been cancelled.

The total number of outbreaks reported (to Wednesday last) since the epidemic started on November 14th was 404, animals slaughtered comprising 23,728 cattle, 14,912 sheep, 9,371 pigs and 26 goats.

Over £1,000,000 Compensation

The Ministry of Agriculture has announced that compensation paid on the first 270 claims by farmers whose stock had been destroyed because of outbreaks of foot-and-mouth disease totalled £1,164,264. This figure covers the period November 14th to May 10th.

Three further outbreaks of foot-and-mouth disease were announced on Tuesday at Aston, near Nantwich, Cheshire, at Holywood, Dumfriesshire, and at Wareham, Dorset.

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ADDRESSES OF DISEASE-INFECTED PREMISES

The list given below indicates, first, the county in which are situated the premises on which disease has been confirmed, followed by the postal address and date of outbreak.

Anthrax:

Berks.—Hornbuckle Farm, Drift Road, Bray, Maidenhead (May 26th).

Dorsetshire.—Colindere Farm, Waterloo Road, Corfe Mullen (May 26th).

Leics.—Glebe Farm, Long Whatton, Loughborough (May 26th).

Norfolk.—Blackwater Farm, Great Witchingham, Norwich (May 27th).

Oxfordshire.—Oxleaze Common Farm, Filkins, Lechlade (May 26th).

Warwicks.—Clenek Cottage, Pinley, Claverdon (May 26th).

Wilts—Bowden Farm, Burbage, Marlborough; Manor Farm, Monkton Farleigh, Bradford-on-Avon (May 27th).

Foot-and-Mouth Disease:

Cheshire.—Old Hall and Hack Green, Nantwich (May 27th); Ash Tree Farm, Kinsall Heath, Audlem; Sheppenhall Hall, Newhall, Aston, Nantwich (May 28th); Austerson Hall, Nantwich (May 29th).

Kent.—Woodfall Farm, Yalding, Maidstone (May 27th); West Hawke Farm, Kingsnorth, Ashford (May 29th).

Oxon.—Crouch Farm, Banbury (May 28th).

Salop.—Bearstone Farm, Woore, Market Drayton (May 28th).

Sussex (E.).—Priors Farm and Hazel Dell, Broadoak, Heathfield; Agmerhurst Farm, Ashburnham (May 27th).

Sussex (W.).—Goldhawkes Farm, Fernhurst, Haslemere (May 28th).

Wilts.—Hayleaze Farm, Crudwell, Malmesbury (May 29th).

Swine Fever:

Derby.—Callow House, Callow Lane, Hasland, Chesterfield; 69, Baslow Road, Totley Rise, Sheffield (May 28th).

Hants.—Keepers Cottage, Rotherwick (May 27th).

Kent.—Newnham Farm, Wickhambreaux (May 27th).

Leics.—Church Farm, Humberstone (May 27th).

Lincs (Kesteven).—Glebe Holding, Silk Willoughby (May 27th).

Northants.—12, Stockwell Road, Milton (May 29th).

Surrey.—Horse Shoe Cottage, Fisher Lane, Chiddingfold (May 28th).

Warwicks.—10, Mitchell Close, Coventry (May 28th).

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VETERINARY NEWS FROM ISRAEL (2)

Mr. C. Aharoni, M.R.C.V.S., writes from Hadera (May 7th, 1952):—

In a previous letter (published February 16th, 1952) a short survey was given of the various activities of veterinary surgeons in Israel; to-day I propose to describe the situation with regard to some infectious diseases.

Foot-and-mouth disease.—This disease used to visit our dairy herds every few years, causing great damage in loss of milk and also in leaving a percentage of valuable milkers with heart and other lesions. At that time the outbreaks were caused by herds moved by road to the slaughterhouses from the surrounding countries. Recently three small outbreaks on the borders were successfully dealt with by immediate vaccination of the surrounding cattle population, and so far no serious outbreak has occurred in Israel.

Anthrax.—Compulsory vaccination of all cattle, sheep, goats and working animals has been carried out regularly every year for a long time, and only very few sporadic cases are occasionally reported.

Theileriasis.—This disease, caused by *Th. annulata,* is endemic in some parts of the country, without in the meantime enlarging

its territorial limits. It is transmitted by the Hyalomma tick and its attacks on young and mainly adult cattle are very often fatal.

The use of immunised blood as a vaccine for young cattle—developed at the parasitological department of the Hebrew University under Professor S. Adler many years ago—has been much extended lately and its value of protection is quite high. For the first injection of 5 c.c. a North African benign strain is used, which causes quite a violent reaction with an average of 5 per cent. fatal results. A second injection of a local strain, given two to three months later, usually does not cause any reaction.

Anaplasmosis.—This disease occurs in nearly all parts of the country, but—when diagnosed early—often yields to good nursing and intensive symptomatic treatment (saline, glucose, cardiac tonics). As the disease often concentrates in certain herds and then causes heavy losses, recently a vaccine based on a South African strain of *A. centrale* has been prepared, and so far a few thousand head of cattle of all ages have been protected successfully.

Piroplasmoses.—These diseases (*B. bigemina*, Babesiella) attack cattle in all parts of the country, but mostly yield to early treatment.

No special vaccine has yet been prepared, but stringent measures against the ticks in nearly all settlements, by regular spraying with DDT and Gammexane preparations, have proved to be very important in limiting the extent of damage caused by all four protozoan diseases. During 20 months in 1950-51 175 cases of Anaplasma, 29 cases of Babesia, 142 cases of Babesiella and 139 cases of Theileria have been diagnosed at the Government Veterinary Laboratory in Tel-Aviv.

As many practitioners rely on their own microscopical diagnosis and, except in special cases, do not send their slides for confirmation to the laboratory, the number of cases confirmed in Tel-Aviv has at least to be doubled if anything like an accurate estimate of the extent of these diseases is to be secured. Ten to 40 per cent. of the cases end fatally, according to the season, the virulence of the strain, the feeding situation, etc.

Brucellosis.—Up to 20,000 head of valuable dairy cattle were under regular control by blood testing and removal of reactors during the last years of the Mandate. This was a quite remarkable achievement which, however, could not be continued in the same way when recently more than 10,000 head of dairy cattle per year were imported from various countries and the danger of introducing infected cattle had to be faced and reckoned with.

It was therefore decided to vaccinate most of the existing cattle population with strain 19 and especially in all those settlements receiving cattle from the U.S.A.

To date (May 7th) 35,000 head have been vaccinated, calves subcutaneously with 5 c.c., cows intradermally with 0·3 c.c. Cows were vaccinated after negative blood tests up to four months of pregnancy, but in some urgent cases of outbreaks and in quarantine, cattle up to seven months of pregnancy have been vaccinated successfully. Of 30 cases of abortion which had occurred after vaccination, in only two cases has strain 19 been isolated from the aborted calf, whilst in 28 cases pathogenic Brucella organisms were found.

All of the vaccine used has been prepared by the veterinary laboratory in Tel-Aviv, where also 250 to 350 aborted calves per year are examined and the blood testing is done. As long as large-scale import of cattle is scheduled to continue, vaccination will be persevered with, but later on it is hoped again to build up clean herds.

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HIGHLANDS AS A RESERVOIR OF BREEDING STOCK

A scheme to improve meat supplies by increasing farming in Scotland was explained by Lord Balfour of Burleigh, Chairman of the Hill Lands (North of Scotland) Commission, at a Press conference at the Scottish Office in London. The scheme, he said, was based mainly on obtaining the co-operation of the whole agricultural community—the small farmer and crofter as well as the large-scale operator—in increasing cattle. One of the main objects which the commission was working towards was to induce the crofter who had one cow to keep two, and to create the winter feed himself to make this possible. Outlining the main points of the scheme, Lord Balfour said that the Highlands should be used to nurture a reservoir of breeding stock.

Various methods of overcoming the main difficulty of winter feeding were suggested, and Lord Balfour said that capital investment was necessary for restoring and increasing winter food production and for stock buying. It was proposed that cattle and sheep should be grazed together. Sheep by themselves reduced the quality of the land, while cattle improved it

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LONDON CART HORSE PARADE

For a large number of horse-loving Londoners a visit to Regent's Park to witness the Cart Horse Parade has become a time-honoured way of spending Whit Monday, and though the weather was not too kind, a heavy storm during the march past of prizewinners—and every entry was awarded a first prize—at least did not interrupt the proceedings.

There were 151 horses in this year's parade, made up of 101 single horses, 20 pairs, one team of four, and six barge horses. The decrease of 25 horses compared with last year was largely accounted for by British Railways entering only five this year, compared with a much higher number last year. The four-horse team was the first to be seen since 1946 and was entered by the President, Mr. H. T. L. Young.

Premiums were awarded for long service and good character to 35 drivers appearing in the parade who had been not less than 20 years in the continuous service of the same employers. The chief of these—the Isabel Constable prize—went to E. Winfield, who has been driving for British Railways (and their predecessors) for 45 years. Brewers, coal merchants, transport contractors and borough councils were the main employers represented at the parade. The prizes were presented by Mrs. Young.

CORRESPONDENCE

The views expressed in letters addressed to the Editor represent the personal opinions of the writer only and their publication does not imply endorsement by the B.V.A.

USE OF HYDROCYANIC ACID IN THE DESTRUCTION OF SMALL ANIMALS

Sir,—The Royal Society for the Prevention of Cruelty to Animals not infrequently refers to me complaints received concerning the use of prussic acid for the destruction of dogs and cats. The R.S.P.C.A. fully recognises that the method of destruction must be left to the discretion of the veterinary surgeon or practitioner in attendance and that there are exceptional circumstances where hydrocyanic acid may be justified.

The Council of the Society has directed that prussic acid for the destruction of animals, on behalf of the R.S.P.C.A., shall not be used save in special cases where a veterinary surgeon considers this advisable.

Notwithstanding some arguments which one occasionally hears in support of this method of destruction, I think it must be generally conceded that the use of prussic acid, without previously rendering the animal insensitive to pain, is to be deprecated—especially in the sight of the laity.

The report of the Special Committee on Small-animal Euthanasia published in 1936 by the N.V.M.A. (now the B.V.A.) stated: "The unanimous conclusion arrived at by the Committee is that the use of hydrocyanic acid *alone*, by any channel, is not a satisfactory method for the destruction of dogs or of cats and is not recommended."

The use of this method of destruction by the profession must inevitably evoke adverse criticism and bring discredit upon its members in the eyes of the not unenlightened public.—Yours faithfully, H. E. Bywater (Liaison Officer, B.V.A./R.S.P.C.A.), Essex House, High Street, Stratford, E.15. *May 29th*, 1952.

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Weekly Wisdom

"Veterinary surgeons are very important people and they should be entitled to priority."—Judge C. B. Fenwick, Q.C. (releasing two M.R.C.V.S. after they had given evidence at Lancaster County Court).

DISEASES OF ANIMALS ACT, 1950—GREAT BRITAIN

Summary of Returns of Confirmed Outbreaks of Scheduled (Notifiable) Diseases

Period	Anthrax	Foot-and-mouth	Fowl Pest	Parasitic Mange	Sheep Scab	Swine Fever
1st to 15th May, 1952	44	86	6	—	—	57
Corresponding period in—						
1951	26	1	6	—	—	36
1950	13	—	1	—	—	—
1949	12	—	21	—	—	—
1st Jan. to 15th May, 1952	218	201	106	—	1	455
Corresponding period in—						
1951	220	18	463	—	4	316
1950	168	12	70	—	19	2
1949	76	11	183	—	27	5